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(54) PLATE LOCK-UP MECHANISM FOR PRINTING MACHINES

(71) We, ROLAND OFFSET-MASCHINENFABRIK FABER & SCHLEICHER AG, a German Company of Christian-Pless-Strasse 6-30, 6050 Offenbach am Main, Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to printing machines and more particularly to a clamping device for securing and adjusting flexible printing plates on the plate cylinder of a printing machine having movably disposed clamping bars within the gap of the cylinder arranged to be moved in axial direction and approximately in circumferential direction of the cylinder, the clamping bars being adapted to secure the plate ends in an exactly reproducible position relative to the clamping bars and being capable of moving to a fixed position in relation to the plate cylinder by means of an adjusting device. Such clamping devices should be constructed so that printing plates can be secured quickly and in an accurately fixed position on the plate cylinder. This is especially important in multicolor printing. It has therefore been customary, for a long while, to provide printing plates with recesses or holes arranged in an accurately fixed position on the plate and cooperating with studs which are mounted on the plate clamping devices when a plate is secured to the cylinder. This permits the printing plate to be secured in an accurately fixed position relative to the clamping device.

Another known system comprises adjusting devices adapted for adjusting the plate clamping device together with the plate mounted thereon in an exactly fixed position in relation to the plate cylinder. As disclosed in German utility model No. 1,998,523 it is known to provide radially movable studs on the plate clamping device, the ends of these studs being conically shaped and adapted to engage with conical holes formed in the plate cylinder. Such devices, however, are subject to a serious disadvantage: whenever readjustment becomes necessary to ensure exact register during printing these studs must be removed. But there is no provision for visual adjustment of the position of the stud in relation to its register-hole. Moreover whenever readjusting the studs to their zero position, i.e. to the position in which the studs had previously been fitted into their respective holes, difficulties arise because it cannot be determined in which direction the clamping device has to be moved. A further problem encountered with such devices is the tendency of the register holes to become clogged with ink so that the studs become jammed. Whenever the studs have not been removed from the register holes before making any readjustment there will be a risk of damaging the snug fit of the register holes.

The present invention provides an adjusting device of high operating reliability and capable of adjusting the clamping device quickly and accurately back to a fixed position in relation to the plate cylinder. According to the present invention there is provided a plate lock-up mechanism for securing and adjusting flexible printing plates on the plate cylinder of a printing machine, which comprises clamping bars each for clamping one end of a printing plate and being movably disposed within a gap in the cylinder and arranged to be movable axially and approximately circumferentially relative to the cylinder, each clamping bar being adapted to secure a leading or a trailing plate and, means fixed in the gap between the clamping bars for the leading and trailing ends of the same plate and having two flat alignment surfaces at an angle to one another, and means having two

corresponding alignment surfaces attached to at least the clamping bar for the leading end of the plate whereby at least the clamping bar for the leading end of the plate may be moved to bring the alignment surfaces fixed on that bar to a position adjacent and coplanar or in parallel planes to those fixed in the gap. In using such alignment surfaces the position of the clamping bar relative to the plate cylinder is immediately visible. Thus there will be no doubt in which direction the clamping bar has to be moved in order to reach its desired zero position. Moreover, the zero position may be gauged even with clamping devices which are in areas of bad visibility thus eliminating errors due to different directions of view. It has been found that the adjustment of the clamping bar may be made very sensitive by aligning two machined surfaces either coplanar or in parallel planes. These alignment surfaces are not subject to wear because they have no contact with each other and any contamination on the surfaces may be easily removed.

Preferably at least one pair of corresponding alignment surfaces i.e. one or a bar and one in the gap, lie in planes substantially perpendicular to the axis of the plate cylinder and preferably alignment surfaces are provided on opposite ends of a clamping bar and lying in planes substantially radial to the axis of the plate cylinder together with corresponding surfaces fixed in the gap. This arrangement of the alignment surfaces perpendicular to the displacement directions of the clamping bar (axially and circumferentially with respect to the plate cylinder) permits an easy adjustment of the zero position. For aligning the clamping bar axially on the cylinder only one alignment surface on the bar, in plane perpendicular to the axis of the cylinder, is required thus saving costs.

Preferably, the alignment surfaces are formed on angle brackets which are fixed on the base of the gap in the plate cylinder and on the clamping bars respectively. Such angle brackets may be installed on existing presses at any time, thus reducing the manufacturing costs. These brackets are suitably arranged to be initially adjustable in relation to the clamping bar and the plate cylinder in order to allow an initial adjustment of the alignment surfaces when mounting the brackets.

The invention further provides a printing plate lock-up mechanism having a plurality of individual clamping bars disposed spaced axially along the cylinder for clamping several plates; two angle brackets may be mounted on each clamping bar, so that each clamping bar may be adjusted individually.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a sectional view of a plate lock-up mechanism with an adjusting device taken substantially on the line I-I of Figure 2;

Figure 2 is a plan view of the plate lock-up mechanism showing only one end of the mechanism;

Figure 3 is a detail view of the plate lock-up mechanism as seen in direction of line III-III;

Figure 4 is a plan view of a device for securing three plates with adjusting devices according to Figure 1 on a reduced scale.

Referring now to the drawings, a plate cylinder 2 of a sheet rotary printing press is provided with a longitudinal gap 1 in which one or more plate clamping bars 3 hereinafter described are positioned. One end of a clamping bar 3 is shown in Figure 2 and for convenience the other end of the clamping bar 3 has not been shown since it is formed symmetrically. For the same reason the plate lock-up mechanism has been shown only for one end of the printing plate (Figure 1 and 2), i.e. the leading edge of the plate which is subject for adjustment with respect to the plate cylinder. The other end of the printing plate, i.e. the trailing edge, may be secured by any conventional device. The leading end of the printing plate 4 comprises two recesses 5 which are adapted to be received by studs 6 mounted on the clamping bar 3 by which the plate 4 is exactly positioned on the clamping bar 3. In that position the plate 4 is clamped against the clamping bar 3 by means of a clamping rail 7. For that purpose socket head screws 8 threadably engaging the clamping bar 3 are tightened.

The clamping bar 3 rests slidably on short rails 9 set on the base of the cylinder gap 1 (see Figures 2 and 3). Bar 3 may be displaced axially and circumferentially with respect to the plate cylinder 2. The clamping bar 3 is displaced in the axial direction of the cylinder by turning the screw 10 threadably engaging the clamping bar and shown in Figure 2 and the corresponding screw 10 at the other end of the plate cylinder; the clamping bar 3 is displaced in the circumferential direction by means of the screws 11, during which helical springs 12 which are guided in holes 13 in the clamping bar 3 and supported between the clamping bar 3 and brackets 14 mounted on the plate cylinder 2 tend to push the clamping bar 3 to the left (Figure 2), i.e. in a direction tending to detension the printing plate.

Screwed to the ends of the clamping bar 3 (see also Figure 4) are angle brackets 15, 16, in which slotted holes 17 (Figure 2) permit a slight displacement of the angle brackets 15, 16 in axial direction of the cylinder. Screwed to the base of the cylinder gap 1 are angle

brackets 19, 20 which are adjustable in the circumferential direction by means of the slotted holes 21. The angle bracket 15 has machined surfaces 23, 24 disposed at right angles to each other and adapted to cooperate with corresponding alignment surfaces 25, 26 on the angle bracket 19.

The clamping bar 3 is lined up with the plate cylinder 2 in its zero position whenever the alignment surfaces 23 and 25 as well as the alignment surfaces 24 and 26 are parallel with each other. The parallelism of these surfaces may be gauged even in poor conditions of visibility. The angle bracket 16 has alignment surfaces 27, 28 (Figure 4) being likewise disposed at right angled to each other and adapted to cooperate with corresponding alignment surfaces 29, 30 on the angle bracket 20. For alignment purposes only a check of the parallelism of the alignment surfaces 28, 30 will be required. The pairs of alignment surfaces may be coplanar when the plate is correctly adjusted in respect of surfaces 23 and 25 and surfaces 27 and 29, surfaces 24 and 26 and surfaces 28 and 30 will be in parallel planes when the plate is correctly adjusted.

Figure 4 illustrates a plan view of the device for securing three plates with clamping devices for both ends of the plate. For that purpose the clamping bar 3 has been divided into three parts (Figure 4) designated by 3', 3'', 3'''. The three plates to be clamped are designated by 4', 4'', 4'''. For convenience the remaining devices arranged on the clamping bars 3', 3'', 3''' correspond to the same reference numerals of Figure 2. The tail ends 4a, 4b, 4c of the plate are secured by the clamping device of Figure 2 but without the location studs 6 and the angle brackets 15, 16. The clamping bars 3', 3'', 3''' as well as the clamping bars 31, 32, 33 can be displaced in axial direction of the cylinder by means of the studs 34, 35, 36, 37 arranged between the clamping bars 3', 3'' or 3'', 3''' and 31, 32 or 32, 33 respectively, having knurled discs 38, 39, 40, 41 in their center portion and threaded on one end threadably to engage one clamping bar and on the opposite end to engage a hole in the other clamping bar which constitutes a support for the respective stud.

WHAT WE CLAIM IS:-

1. A plate lock-up mechanism for securing and adjusting flexible printing plates on the plate cylinder of a printing machine, which comprises clamping bars movably disposed within a gap in the cylinder and arranged to be movable axially and approximately circumferentially relative to the cylinder, each clamping bars being adapted to secure a leading or a trailing plate end, means fixed in the gap between the clamping bars for the leading and trailing ends of the same plate and having two flat alignment surfaces at an angle to one another, and means having two corresponding alignment surfaces attached to at least the clamping bar for the leading end of the plate, whereby at least the clamping bar for the leading end of the plate may be moved to bring the alignment surfaces fixed on that bar to a position adjacent and coplanar or in parallel planes to those fixed in the gap.

2. A plate lock-up mechanism according to claim 1 and wherein at least one clamping bar bears one alignment surface lying in a plane perpendicular to the axis of the plate cylinder and two alignment surfaces on opposite ends of the bar and lying in planes substantially radial to the axis of the plate cylinder.

3. A plate lock-up mechanism according to claim 1 or 2 wherein the alignment surfaces are formed on angle brackets fixed on the base of the gap of the plate cylinder and on the clamping bars.

4. A plate lock-up mechanism according to any one of claims 1-3 and having a plurality of clamping bars being disposed spaced axially along the cylinder for clamping several plates, each clamping bar having two angle brackets bearing alignment surfaces mounted thereon.

5. A plate lock-up mechanism substantially as hereinbefore described with reference to the accompanying drawings.

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1431815 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

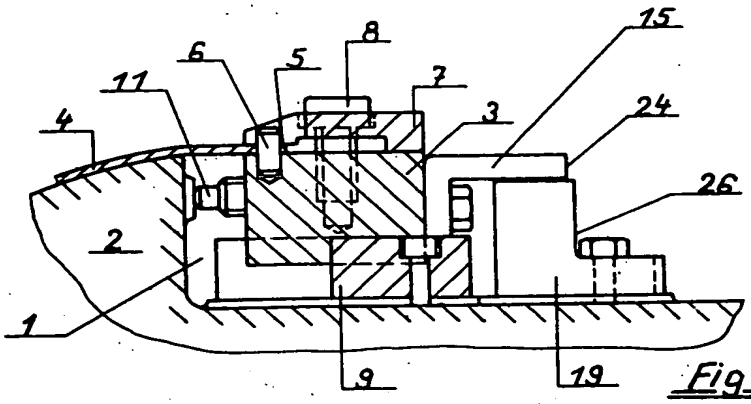

Fig 1

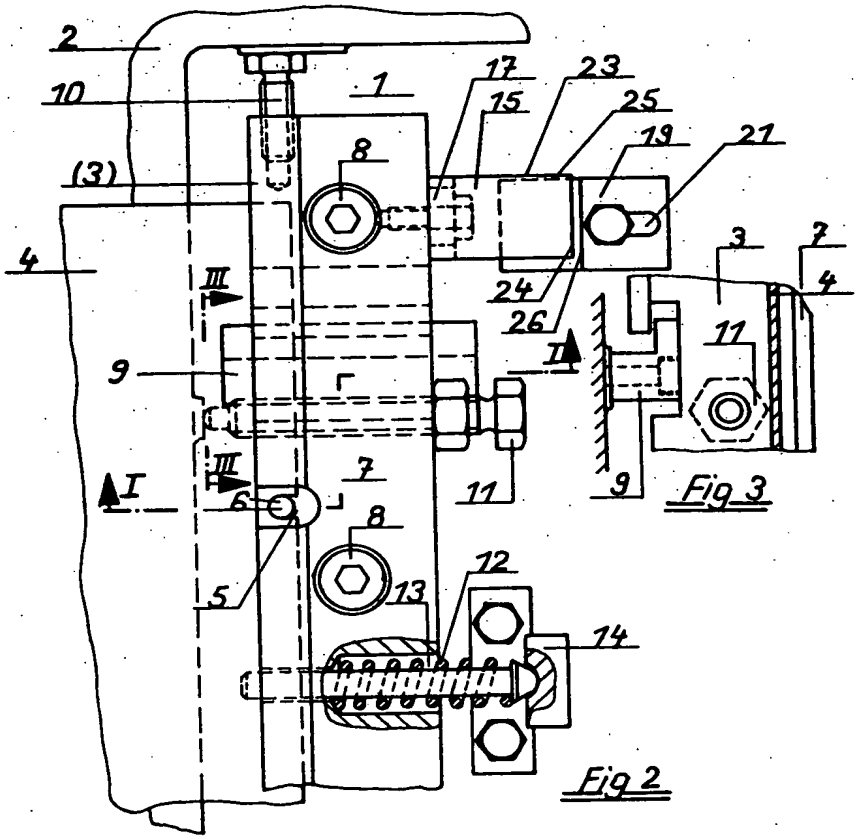

Fig 3

Fig 2

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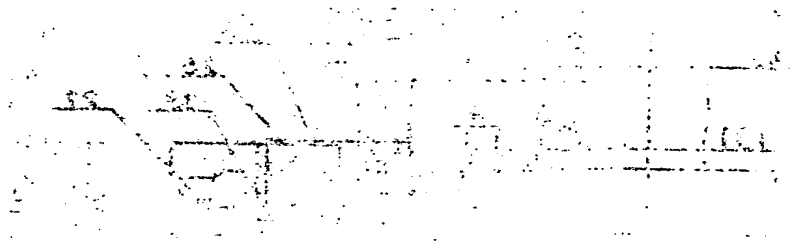

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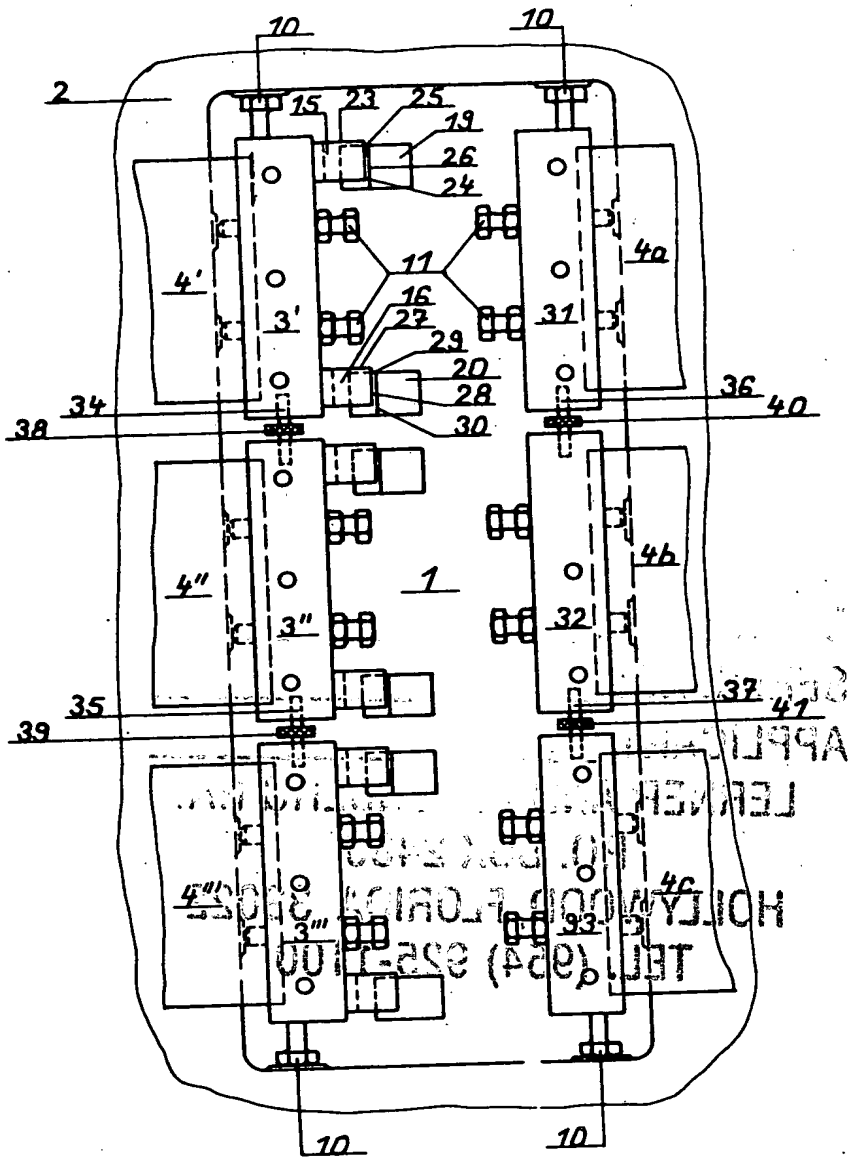
2 SHEETS This drawing is a reproduction of the Original on a reduced scale

Sheet 2

Fig. 4



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